Cruise report Alkor 506

SEDINO III - Fehmarnbelt/Pomeranian Bight
28.03-10.04.2018

Institute of Geosciences (IfG)
Kiel University (CAU)

C | A | U
Christian-Albrechts-Universität zu Kiel

Kiel, 20. 04.2018
Peter Richter

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Abbreviations:

Sidescan Sonar (towed) ……………………………………..**SSS**
Innomar Subbottom Profiler (hull mounted)………………..**SES**
Grab Sampler…………………………………………………**GS**
Gravity Corer …………………………………………………**GC**
Giant Box Corer………………………………………………**GBC**
Underwater Video ……………………………………………**UWV**
Conductivity Temperature Depth probe…………………....**CTD**

1. Participants

Dr. Peter Richter	Chief Scientist
Gianna Persichini	Scientist
Nils Steinfeld	Scientist
Giuliana Diaz	Scientist
Penele Borgeest	Scientist
Steven Weber	Scientist
Michael Fuhr	Scientist
Dorian Harder	Scientist
Anett Janasch	Scientist
Jan-Eike Rossius	Scientist
Dr. Daniel Unverricht	Scientist (only 28th March)

2. Cruise Narrative

(Time in UTC)

28th March 2018

Departure: 06:00 Kiel
Transit to study site (Fehmarnbelt)
Arrival at study site: 10:00
Coring with GC: 10:15 (7 Stations)
Then transit to Warnemünde

Arrival: 17:15 at Warnemünde

Weathering during night

Weather: Cloudy, light sleet 5 Bft E, in the evening increasing (7-8 Bft E)

29th March 2018

Departure: 06:00 Warnemünde
Transit to study site (Oderbank)

18:10 Hydroacoustic profiles with SSS and SES

During night: Profiles with SSS and SES

Weather: Cloudy, Snowfall, 7-8 Bft E, in the afternoon decreasing, 3-4 Bft ENE

30th March 2018

Hydroacoustic profiles with SSS and SES

During night: Profiles with SSS and SES

Weather: Cloudy, 3-4 Bft circulating

31th March 2018

Cancellation of measurements, because of oncoming bad weather front 10:05

Arrival: Sassnitz (Mukran) at 12:30

Weathering at Sassnitz (Mukran)

Weather: Cloudy, Snowfall, 8 Bft E, in gusts 9-10 Bft

1st April 2018

Weathering at Sassnitz (Mukran)

Cloudy, Schnowfall, 8 Bft E in gusts 9-10 Bft

2nd April 2018

Departure: Sassnitz (Mukran) at 6:00

Hydroacoustic profiles with SSS and SES 7:40
During night: Profiles with SSS and SES

Weather: Sunny, 5-6 Bft WSW, decreasing, 3-4 Bft SW

3rd April 2018

7:15 Sampling with GS (29 stations)
Hydroacoustic profiles with SSS and SES at 15:06
During night: Profiles with SSS and SES

Weather: Cloudy, 4 Bft SW

4th April 2018

6:30 Uhr Sampling with GBC (4 stations)
8:37 UWV (5 Profiles)
Hydroacoustic profiles with SSS and SES at 14:52
During night: Profiles with SSS and SES

Weather: Sunny, 2 Bft SW

5th April 2018

Hydroacoustic profiles with SSS and SES
During night: Profiles with SSS and SES

Weather: Sunny, 2-3 Bft WSW, increasing 4-5 Bft SW

6th April 2018

8:00 GS (25 stations)
CTD at 14:40
Hydroacoustic profiles with SSS and SES at 14:50
During night: Profiles with SSS and SES

Weather: Cloudy, 4Bft SW

7th April 2018

07:02 Sampling with GBC (4 stationes)
09:47 UWV (4 profiles)
Hydroacoustic profiles with SSS and SES at 13:17
During night: Profiles with SSS and SES

Weather: Sunny, 3Bft SE

8th April 2018

Hydroacoustic profiles with SSS and SES at 13:17
During night: Profiles with SSS and SES

Weather: Sunny, 4Bft SE

9th April 2018

Hydroacoustic profiles with SSS and SES till 08:40
UWV (2 profiles)
10:30 SES profile
11:00 Deinstallation of devices

Transit to Kiel

Weather: Sunny, 2-3 Bft NW

9th April 2018

Arrival: Kiel at 6:00

3. Introduction

Generally, the geological evolution of the Baltic Sea is a well-known and frequently investigated issue. The area of the south western Baltic Sea, has been repeatedly overprinted by Scandinavian Ice sheets during its quaternary development (e.g. Björck,1995; Niedermeyer et al., 2011). In contrast to the German Bight, this is also valid for the last glacial period, the Weichselian glaciation (Duphorn et al. 1995, Niedermayer et al. 2011). Stratigraphically, this glaciation can be subdivided into Brandenburger, Frankfurter, Pomeranian and Mecklenburg stage. The area of the Oderbank is located at the rim of the 'Nordrügener Staffel' belonging to the Meckelnburg Stage (Woldstedt & Duphorn 1974). After the retreat of the ice sheet from the area of the southern Baltic Sea, the postglacial evolution began. The complex interaction of isostatic movement, sea level fluctuations and local tectonic activities, led to alternating phases of seawater, brackish water and freshwater in the Baltic Sea (Lampe et al., 2011, Björk, 1995).
The evolution of the Pomeranian Bay environment since the last deglaciation is not well known (Lemke, 1998; Kostecki & Janczak-Kostecka, 2011). At least it is not as well investigated as other parts of the Baltic Sea. However, in various studies, the surface sediment distribution patterns and the surface near built up of adjoining areas have been reconstructed, which provides a lot of information for the envisaged study site.
The surface sediments in the Pomeranian Bight area are generally characterized by a patchy distribution of mainly two different types of sediments. The largest part consists of recent to sub-recent sand, forming a layer up to 2 m thickness (established by seismic data and vibrocores), smaller areas are built up of a heterogeneous material composed of coarse sand to boulders (lag deposits) derived from submarine erosion of glacial till (Schwarzer et al. 2003). The surface sediment distribution patterns seem to be stable for at least several years. Depositional areas are predominantly accomplished by material finer than sand (Tauber & Emeis, 2007). The lag deposits are either linked to till outcrops or found at the base of channel-like structures cut into the sand layer (Verse et al 1998, Schwarzer et al. 2003).
A spatially limited subbottom profiler datasets taken with an Innomar 2000 SES hull mounted on RV Alkor during the teaching course "Environmental Surveying" (Al 477) show extended channel system structures in the subsurface. These features are located near the Oder Bank extending from the Greifswalder Oie. Possibly they reflect lateral branches of the ancient Oder fluvial system. Basically some of these channels are capped unconformable by a fine to medium sand coverage of 1 m to 1.5 m thickness. Concomitantly, similar structures are lying directly beneath the surface with only 10 -20 cm sand coverage. These seem to be at least two generations of channels systems, because it can be observed, that the surface near structures cut into the underlying channel deposits (Fig.1).

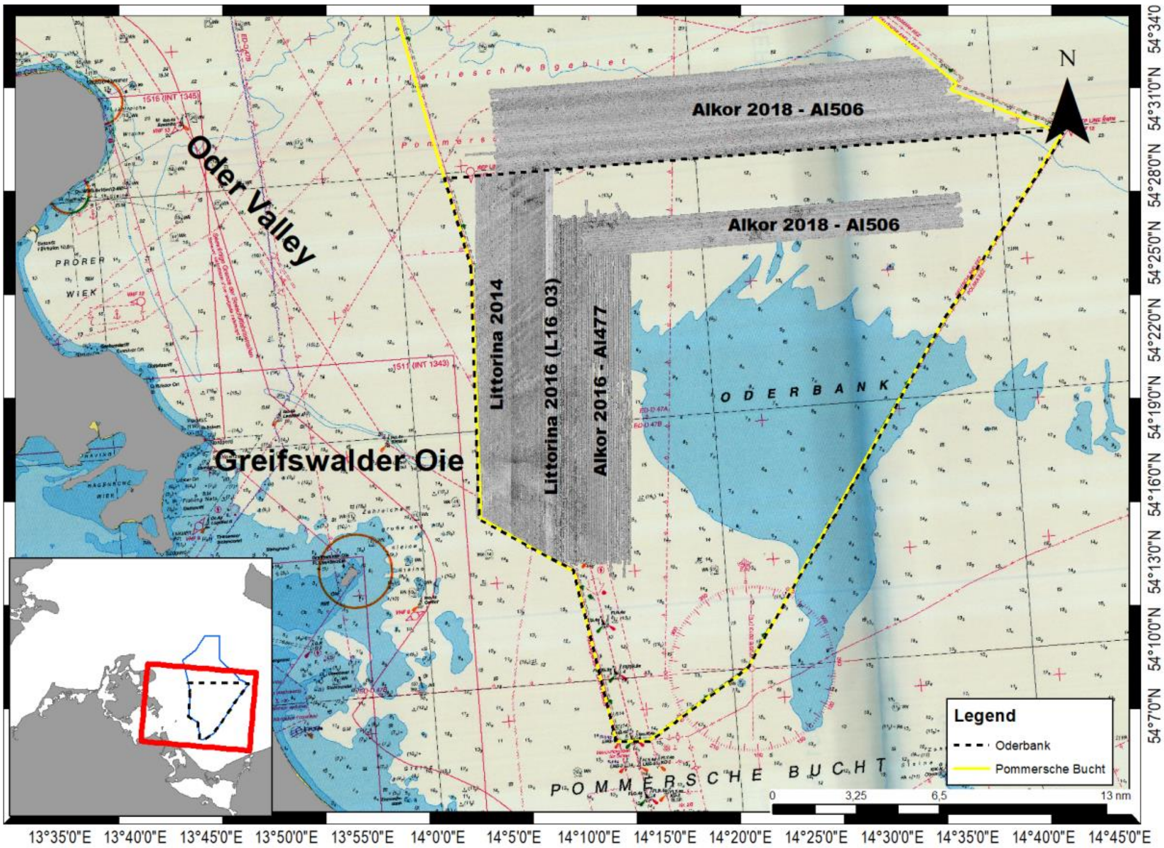


Fig. 1: Overview of the Pomeranian Bight, including recently collected side scan sonar data in the frame of the project SEDINO and SEDINO II (Littorina 03/2014,L16-03, small part of Al477). SES –Data is only available in a small part between 14° 11,400' E and 14° 14,300'E. Also shown is the area of Al506, including Sidedscan Sonar and SES data.

The research cruise Al506 aims to get new insights in structure and built up of this channel system. The question, if this can be assigned to the ancient Oder river system, is in the focus. The possibility, that these structures might have different origins, e.g. due to backfilled depressions of dead ice, is likewise considered, and it will be clarified, which scenario is applicable. With narrowly arranged SES profiles it is aimed to trace the channels and get information of their longitudinal extension, the striking direction, as well as the chronological succession of their deposition, which is aimed to be reconstructed by structural analyses. Furthermore surface sediment distribution maps, derived from continuous and high resolution sidescan sonar mosaics (partly already collected from Cruises with FK Littorina in the frame of this project, partly new data from the envisaged cruise), will be aligned to the subsurface structures, to unravel if they influence the recent sediment distribution.

4. Equipment

To provide information about the spatial distribution of bathymetry, sediment consistency and sedimentary texture, the application of high resolution hydroacoustic measuring techniques is common (Kenny et al. 2002, Hamilton 2005, Boyed et al. 2007, Blondel 2009, Lamarche, 2011). This method offers new detailed insights in the sedimentary structure and the sea bed properties (Diesing & Schwarzer 2006, Schwarzer & Diesing 2003, 2004, Feldens et al. 2010; Mielck

2014), and allow conclusions on recent sediment dynamics (Zeiler et al. 2000, Chang et al. 2006, Bartholomä, 2006, Mienert & Weaver 2012). Moreover, these modern methods can be used in combination with sediment classification systems and under water video systems, for mapping habitats and benthic communities (Cochrane & Lafferty 2002, Ehrhold et al. 2006, Rooper & Zimmermann 2007, Degraer et al. 2008a,b, Le Bas & Huvenne 2009, van Overmeeren 2009, van Rein et al. 2011, Barberá 2012).

Sidescan Sonar (SSS)

The seafloor is imaged by using a Side-Scan Sonar, Teledyne Benthos, SIS-1624 - dual frequnecy (Fig. 2). The device is commonly referred to as “towfish” which is towed behind the vessel. Transducers on each side of the device generate and transmit acoustic beams into the water-column and record them after their reflection and refraction from the seafloor. The travel time to reach the seabottom is converted into water depth, whereas the energy of the reflected acoustic signal provides information about sediment surface properties. Generating acoustic signals in different frequencies display different features of the same seafloor properties. The applied frequencies during this cruise accounted for 160kHz and 400kHz. Since ships movement are reflected in the raw data of acoustic signals, the tow vehicle includes pitch, roll and heading sensors to correct the collected signals.

The range, the length of the profiled area to each side, was set to 100 m. By setting the distance between the Profiles to 0.1 nautical mile (app. 185 m), overlap of approximately 20 m between neighboring profiles was intended. The altitude of the towfish above the seafloor is adjusted to the water depth and prevailing wave conditions. The layback of the towfish behind the ship during Profiling was in the range of 10 to 15 m. The layback was controlled by IfG’s own winch (Cormac Q, Mac Artney Underwater Technology). The ship’s speed was kept between 4 to 5 knots.

Sediment Echo Sounder (SES)

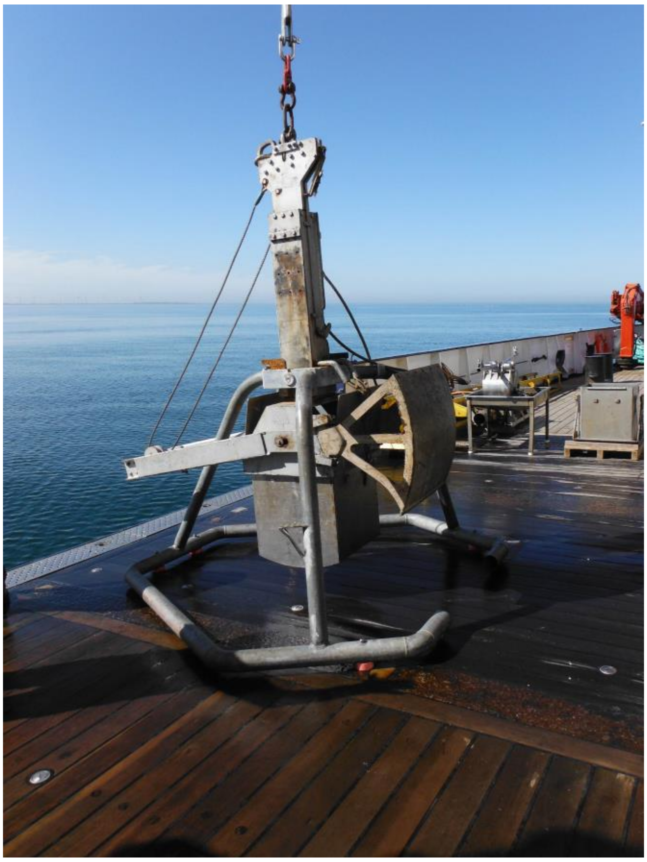
The sub-bottom is profiled by a SES-2000 standard narrow beam parametric sub bottom profiler (Innomar Technologie GmbH). Sub-seafloor sediment structures are surveyed by the reflection of echo-signals at layers and/or objects. The travel-time of the reflected signal through the water column is converted into distances. The penetration depth of the sound signal depends on the transmitted frequency, where the lower frequency (4-15kHz) using the parametric acoustical effect is used to detect deeper structures in contrast to the higher frequency (100kHz) which primary follows the seafloor. A Kongsberg-EM 3000 motion sensor is used for correction of heave, roll and pitch of the ships movement

Gravity Corer (GC)

A gravity corer with a pipe length of 6m and a weight of 1.2 tons was applied to get long sediment cores. The cores were cut into pieces of 1m length and the liners were closed with caps on both ends.

Grab Sampler (GS)
Van Veen grab sampling (here a HELCOM grab sampler) is a fast method to sample surface sediments precisely with low effort. During Al506 the sampling stations were chosen based on a roughly prepared Side-Scan Sonar mosaic. The grab sampler is deployed from the ship by a winch. Due its own weight the shovels penetrate into the sediment. Obviously, the sediment surface gets partly disturbed under these conditions. Sediment samples are used to validate the data of the performed hydroacoustic survey. The samples are described on board and prepared for further laboratory analyses at Kiel University.

Giant Box Corer (GBC)
The giant box corer allows to investigate undisturbed samples from the sediment surface. The surface area, which is sampled, amounts to 0.25 m² (50 cm x 50 cm); the maximum penetration is 60cm in soft sediments. On a sandy seafloor the penetration seldom reaches more than 20 – 30 cm.



Underwater Video (UWV)
Video tracks are recorded and displayed in real time by Mariscope Micro underwater video camera and detailed images of the seafloor near giant box core stations are gained while the video camera is towed shallow above ground under slow ship speed.

Conductivity Temperature Depth (CTD) probe
In order to calibrate the sound velocity of all hydroacoustic devices, sound-velocity profiles are measured with a CTD ("Sea & Sun Technology"), which measures the

parameters pressure, salinity and temperature with depth, defining the sound velocity. The CTD probe is lowered in the water with a wire cable, where the data cable is attached, down to 1 m above the sea-floor.

5. Performed work and preliminary Results

During Al506 in total an area of 297 km² was covered by comprehensive and high resolution Sidescan Sonar measurements, which corresponds to a distance of ~834 nm of narrow standing hydroacoustic profiles (Fig.2). Sediment sampling stations and under water video profiles were determined on the base of the Sidescan Sonar mosaic, consisting of a processed 400 kHz frequency, and Sediment Echo Sounder datasets. Overall 54 grab samples (Fig. 3) and 8 giant box corer samples were taken and 9 Videoprofiles were performed. Sidescan and SES profiles are E-W orientated and border the Mosaics of cruises L16_and 17_03 to the north respectively to the south.

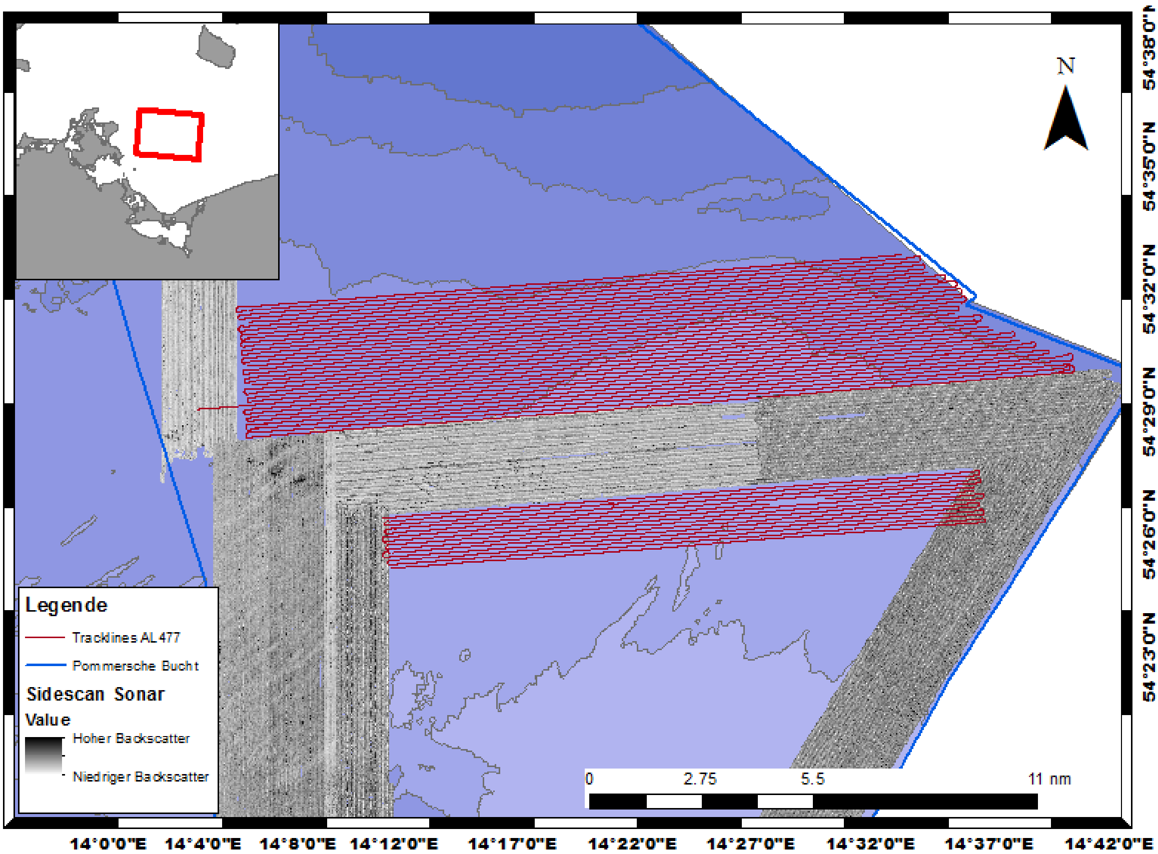


Fig. 2:Tracklines overview of Al506.

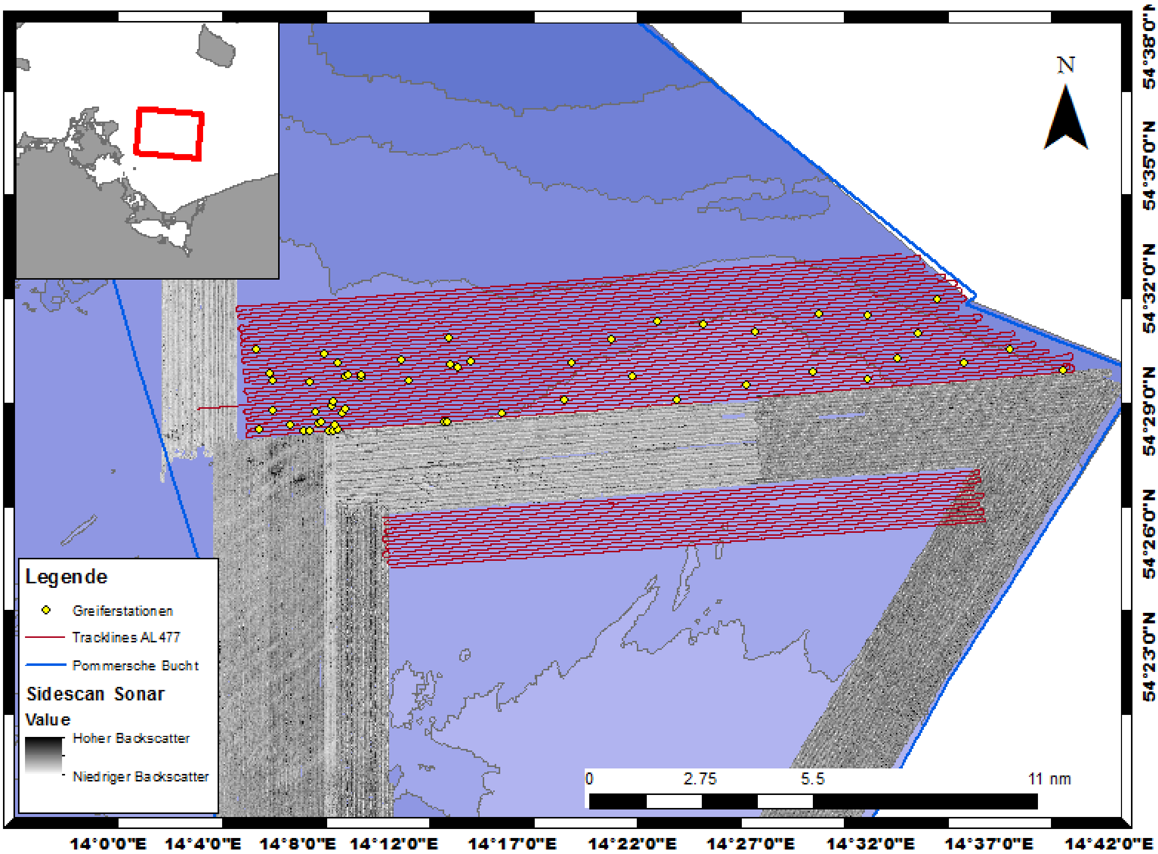


Fig. 3: Grab sampling stations Al506.

The Sidescan Sonar data shows a predominantly homogeneous surface sediment distribution pattern (Fig. 4), mainly consisting of fine to medium sand. These sediments show low backscatter values, which are illustrated in bright gray shades on the sidescan mosaic. In some areas, this pattern is intermitted by the outcrop of patchy areas, consisting of coarse sand to fine gravel, often combined with medium gravel and rocks (Fig. 5). These sediment show high backscatter values and are illustrated in dark gray shades. The gravelly areas are often elongated, though they show randomly orientated striking directions. Mostly the occur in the Southern part of the Al506 working area and in the north-western part of the Northern part of the working area (Fig. 4).

The Giant box corer sampling was conducted in areas, where the structures from the subsurface come close to the seafloor or even crop out (Fig. 6). The contact to the overlying fine sand is in some cases not sharp, but shows a 10 cm to 15 cm thick transition zone. In these cases, the subsurface structures are filled with clayey and silty material. In other cases, predominantly in areas with high backscatter values on the mosaic, gravelly material crops out to the surface. It has turned out, that the transition to the overlying fine sand in these cases shows sharp contacts, without a transition zone. Probably these two cases represent structures of different origins.
Profiles of underwater video illustrate that areas of high backscatter can serve as a habitat for benthic communities. Boulders can have a diameter from up to 50-60 cm. Grainsize analyses in this areas shows a distribution with a maximum at the coarse sand and fine gravel spectrum (Fig. 7).

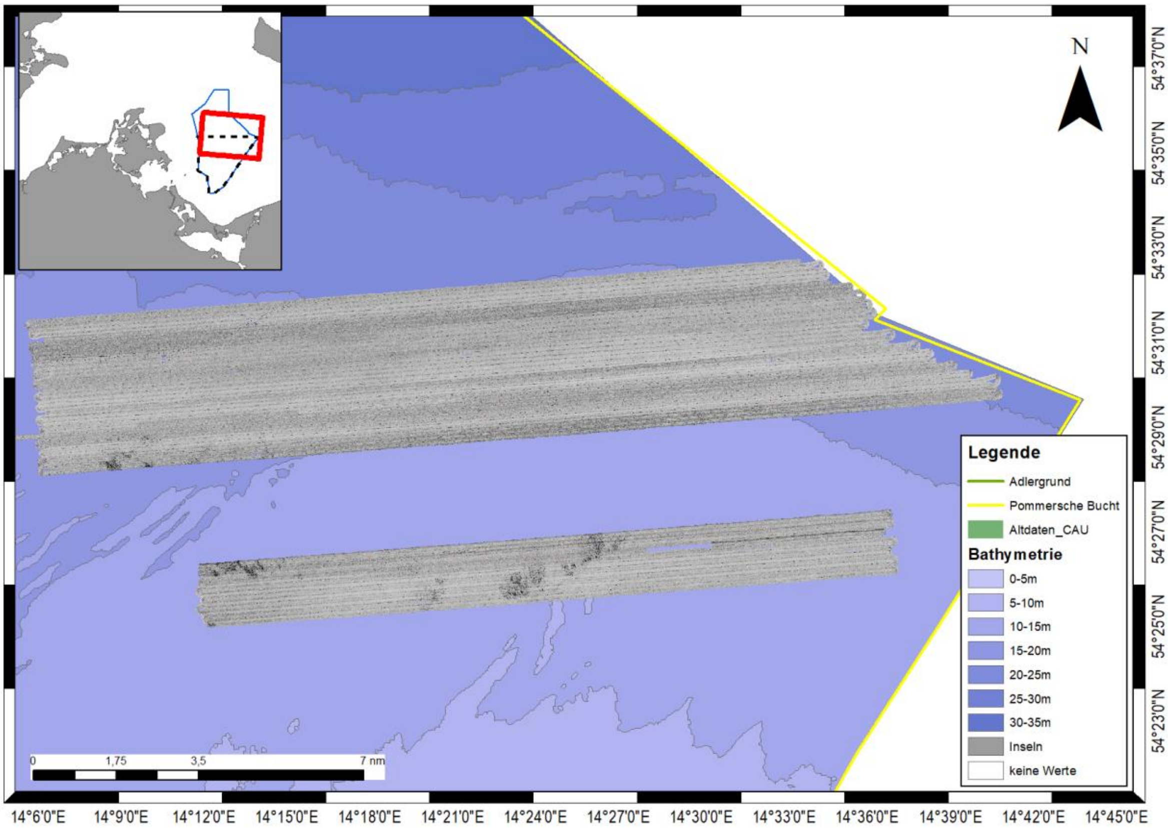


Fig.4: Sidescan Sonar mosaic of Cruise Al506.

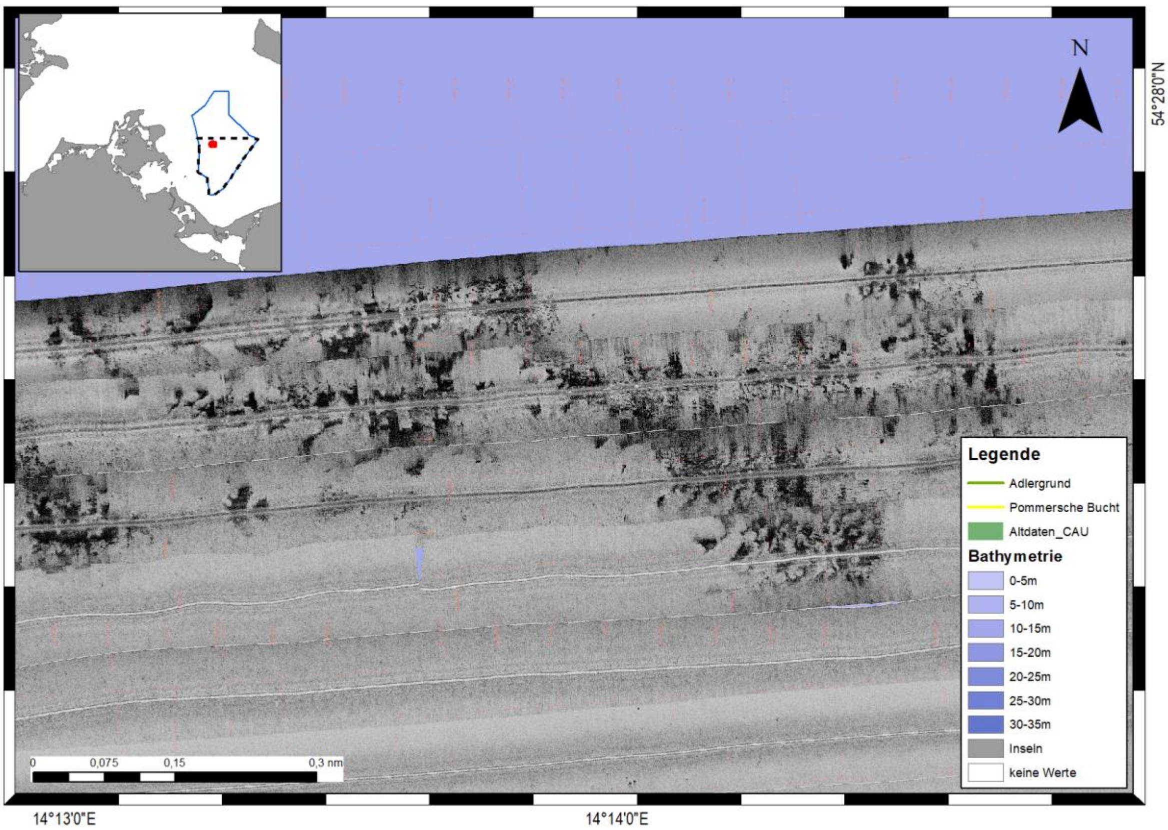


Fig.5: Detailed image of a sidescan sonar mosaic showing areas with high backscatter values, representing coarse sand to gravelly material.

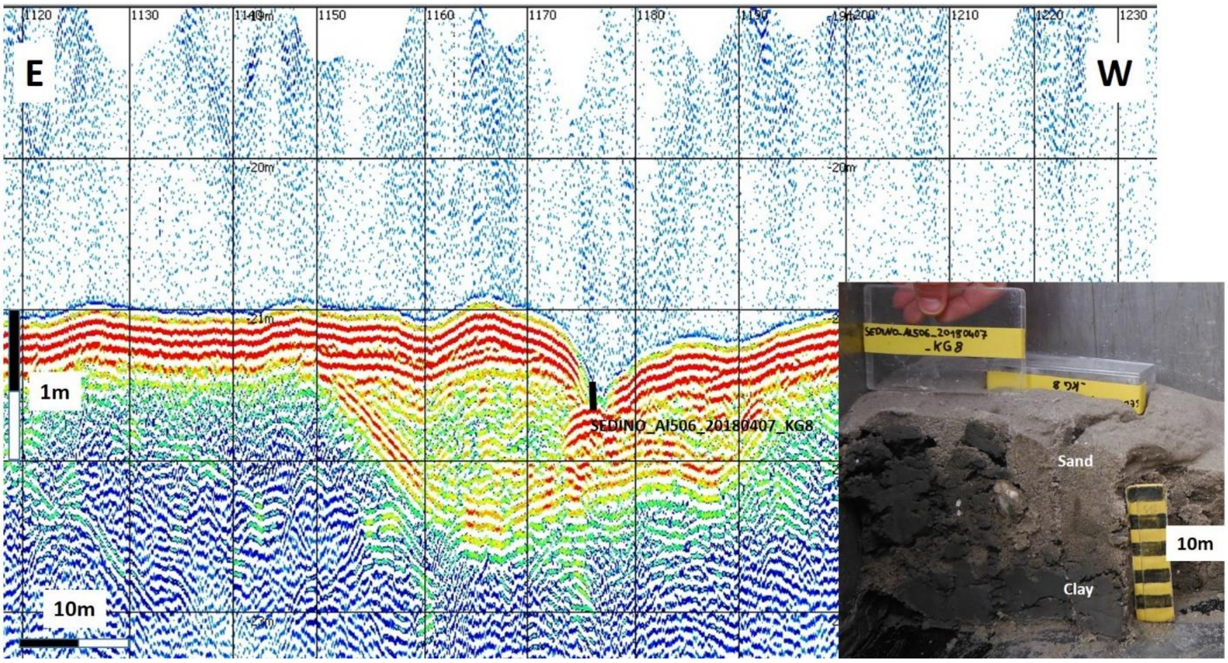


Fig.6 : SES-image of a Giant Box corer Station. The structure in the Subsurface is filled with clayey material. On top a sandy layer is deposited.

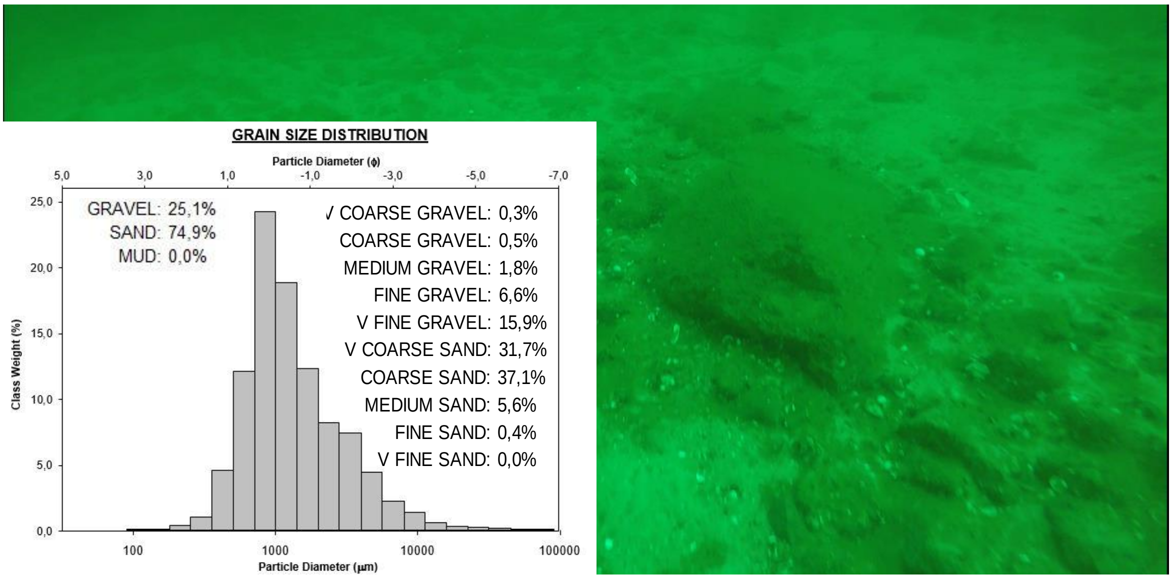


Fig.7: Video image of an area consisting of coarse sand to fine gravel with rocks and boulders. This material provides a lot of surface area for benthic organisms.

6. Acknowledgements

We would like to thank master Friedhelm von Staa, officers and crew members of RV Alkor for the excellent support during cruise Al506.

7. References

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8. Appendix

Hydroacoustic profiles
(Time in UTC, Latitude and Longitude in decimal degrees)

Name	Date/Time	Longitude	Latitude	
Profil 1	29.03.2018 16:05:58	14° 41.320' E	54° 30.118' N	Start
Profil 1	29.03.2018 20:34:28	14° 7.217' E	54° 30.154' N	End
Profil 2	29.03.2018 20:34:28	14° 7.214' E	54° 30.147' N	Start
Profil 2	30.03.2018 01:05:14	14° 41.531' E	54° 30.088' N	End
Profil 3	30.03.2018 01:05:14	14° 41.532' E	54° 30.089' N	Start
Profil 3	30.03.2018 05:41:03	14° 7.024' E	54° 30.210' N	End
Profil 4	30.03.2018 05:41:03	14° 7.020' E	54° 30.207' N	Start
Profil 4	30.03.2018 09:58:07	14° 41.525' E	54° 30.373' N	End
Profil 5	30.03.2018 09:58:08	14° 41.529' E	54° 30.377' N	Start
Profil 5	30.03.2018 14:13:50	14° 7.410' E	54° 30.431' N	End
Profil 6	30.03.2018 14:13:50	14° 7.410' E	54° 30.431' N	Start
Profil 6	30.03.2018 18:29:16	14° 40.728' E	54° 30.574' N	End
Profil 7	30.03.2018 18:29:16	14° 40.728' E	54° 30.574' N	Start
Profil 7	30.03.2018 22:42:57	14° 7.378' E	54° 30.628' N	End
Profil 8	30.03.2018 22:42:57	14° 7.378' E	54° 30.627' N	Start
Profil 8	31.03.2018 02:59:51	14° 40.186' E	54° 30.766' N	End
Profil 9	31.03.2018 02:59:51	14° 40.187' E	54° 30.767' N	Start
Profil 9	31.03.2018 07:05:57	14° 7.275' E	54° 30.825' N	End
Profil 10	31.03.2018 07:05:57	14° 7.275' E	54° 30.825' N	Start
Profil 10	02.04.2018 13:39:05	14° 7.397' E	54° 30.920' N	End
Profil 11	02.04.2018 13:39:05	14° 7.397' E	54° 30.921' N	Start
Profil 11	02.04.2018 17:24:41	14° 39.362' E	54° 31.069' N	End
Profil 12	02.04.2018 17:24:41	14° 39.364' E	54° 31.070' N	Start
Profil 12	02.04.2018 21:14:44	14° 7.139' E	54° 31.091' N	End
Profil 13	02.04.2018 21:14:44	14° 7.136' E	54° 31.085' N	Start
Profil 13	03.04.2018 00:47:13	14° 33.730' E	54° 31.256' N	End
Profil 14	03.04.2018 00:47:13	14° 33.800' E	54° 31.257' N	Start
Profil 14	03.04.2018 05:11:25	14° 7.326' E	54° 31.310' N	End
Profil 15	03.04.2018 05:11:25	14° 7.323' E	54° 31.308' N	Start
Profil 15	03.04.2018 16:40:51	14° 7.212' E	54° 31.387' N	End
Profil 16	03.04.2018 16:40:51	14° 7.215' E	54° 31.382' N	Start
Profil 16	03.04.2018 20:15:28	14° 37.881' E	54° 31.544' N	End
Profil 17	03.04.2018 20:15:28	14° 37.882' E	54° 31.547' N	Start
Profil 17	03.04.2018 23:57:55	14° 7.322' E	54° 31.602' N	End
Profil 18	03.04.2018 23:57:55	14° 7.321' E	54° 31.602' N	Start
Profil 18	04.04.2018 02:50:08	14° 31.430' E	54° 31.730' N	End
Profil 19	04.04.2018 02:50:08	14° 31.430' E	54° 31.731' N	Start
Profil 19	04.04.2018 14:45:58	14° 36.937' E	54° 31.828' N	End
Profil 20	04.04.2018 14:45:58	14° 36.940' E	54° 31.831' N	Start

Profil 20	04.04.2018 18:30:29	14° 7.358' E	54° 31.887' N	End
Profil 21	04.04.2018 18:30:29	14° 7.358' E	54° 31.890' N	Start
Profil 21	04.04.2018 22:23:33	14° 37.192' E	54° 32.028' N	End
Profil 22	04.04.2018 22:23:33	14° 37.195' E	54° 32.030' N	Start
Profil 22	05.04.2018 02:20:05	14° 7.368' E	54° 32.088' N	End
Profil 23	05.04.2018 02:20:05	14° 7.366' E	54° 32.086' N	Start
Profil 23	05.04.2018 06:01:58	14° 37.024' E	54° 32.217' N	End
Profil 24	05.04.2018 06:01:58	14° 37.027' E	54° 32.216' N	Start
Profil 24	05.04.2018 09:55:12	14° 7.365' E	54° 32.278' N	End
Profil 25	05.04.2018 09:55:12	14° 7.365' E	54° 32.282' N	Start
Profil 25	05.04.2018 13:31:52	14° 36.851' E	54° 32.418' N	End
Profil 26	05.04.2018 13:31:52	14° 36.851' E	54° 32.417' N	Start
Profil 26	05.04.2018 17:19:47	14° 7.319' E	54° 32.466' N	End
Profil 27	05.04.2018 17:19:48	14° 7.315' E	54° 32.470' N	Start
Profil 27	05.04.2018 21:02:47	14° 36.359' E	54° 32.617' N	End
Profil 28	05.04.2018 21:02:47	14° 36.359' E	54° 32.615' N	Start
Profil 28	06.04.2018 01:12:04	14° 7.330' E	54° 32.667' N	End
Profil 29	06.04.2018 01:12:04	14° 7.329' E	54° 32.671' N	Start
Profil 29	06.04.2018 04:41:33	14° 36.026' E	54° 32.801' N	End
Profil 30	06.04.2018 04:41:34	14° 36.028' E	54° 32.801' N	Start
Profil 30	06.04.2018 15:03:17	14° 35.823' E	54° 32.899' N	End
Profil 31	06.04.2018 15:03:17	14° 35.823' E	54° 32.898' N	Start
Profil 31	06.04.2018 18:23:05	14° 7.376' E	54° 32.958' N	End
Profil 32	06.04.2018 18:23:05	14° 7.373' E	54° 32.958' N	Start
Profil 32	06.04.2018 21:53:57	14° 35.351' E	54° 33.200' N	End
Profil 33	06.04.2018 21:53:57	14° 35.349' E	54° 33.199' N	Start
Profil 33	07.04.2018 01:10:29	14° 7.343' E	54° 33.150' N	End
Profil 34	07.04.2018 01:10:30	14° 7.343' E	54° 33.151' N	Start
Profil 34	07.04.2018 04:33:35	14° 35.118' E	54° 33.295' N	End
Profil 35	07.04.2018 11:16:26	14° 12.411' E	54° 27.825' N	Start
Profil 35	07.04.2018 14:21:02	14° 37.320' E	54° 27.839' N	End
Profil 36	07.04.2018 14:21:02	14° 37.324' E	54° 27.835' N	Start
Profil 36	07.04.2018 18:32:41	14° 12.675' E	54° 27.723' N	End
Profil 37	07.04.2018 18:32:41	14° 12.674' E	54° 27.719' N	Start
Profil 37	07.04.2018 22:10:49	14° 37.354' E	54° 27.644' N	End
Profil 38	07.04.2018 22:10:49	14° 37.354' E	54° 27.638' N	Start
Profil 38	08.04.2018 01:52:43	14° 12.688' E	54° 27.531' N	End
Profil 39	08.04.2018 01:52:43	14° 12.688' E	54° 27.529' N	Start
Profil 39	08.04.2018 04:01:29	14° 27.132' E	54° 27.441' N	End
Profil 40	08.04.2018 04:01:29	14° 27.132' E	54° 27.439' N	Start
Profil 40	08.04.2018 08:58:38	14° 22.309' E	54° 27.343' N	End
Profil 41	08.04.2018 08:58:38	14° 22.309' E	54° 27.344' N	Start
Profil 41	08.04.2018 12:09:55	14° 29.303' E	54° 27.253' N	End
Profil 42	08.04.2018 12:09:55	14° 29.303' E	54° 27.255' N	Start
Profil 42	08.04.2018 15:14:36	14° 12.681' E	54° 27.149' N	End

Profil 43	08.04.2018 15:14:36	14° 12.681' E	54° 27.147' N	Start
Profil 43	08.04.2018 18:10:50	14° 37.334' E	54° 27.061' N	End
Profil 44	08.04.2018 18:10:50	14° 37.334' E	54° 27.062' N	Start
Profil 44	08.04.2018 20:18:27	14° 19.241' E	54° 26.955' N	End
Profil 45	08.04.2018 20:59:53	14° 19.241' E	54° 26.953' N	Start
Profil 45	09.04.2018 00:03:17	14° 30.426' E	54° 26.864' N	End
Profil 46	09.04.2018 00:03:17	14° 30.427' E	54° 26.865' N	Start
Profil 46	09.04.2018 03:00:47	14° 19.547' E	54° 26.765' N	End
Profil 47	09.04.2018 03:00:47	14° 19.546' E	54° 26.763' N	Start
Profil 47	09.04.2018 05:44:18	14° 37.435' E	54° 26.668' N	End
Profil 48	09.04.2018 05:44:18	14° 37.399' E	54° 26.667' N	Start
Profil 48	09.04.2018 08:40:56	14° 12.565' E	54° 26.567' N	End

Grab samples

Name	Longitude	Latitude	Date/Time
SEDINO20180403_1	14.1271989	54.53569963	03.04.2018/07:38
SEDINO20180403_2	14.13570338	54.52592637	03.04.2018/07:47
SEDINO20180403_3	14.13681489	54.52239394	03.04.2018/07:56
SEDINO20180403_4	14.16304189	54.52074255	03.04.2018/08:05
SEDINO20180403_5	14.17448778	54.53215033	03.04.2018/08:17
SEDINO20180403_6	14.1834957	54.52817286	03.04.2018/08:34
SEDINO20180403_7	14.18817119	54.52227753	03.04.2018/08:44
SEDINO20180403_8	14.19063693	54.5229759	03.04.2018/08:53
SEDINO20180403_9	14.19946399	54.52114646	03.04.2018/09:05
SEDINO20180403_10	14.19979947	54.5224337	03.04.2018/09:13
SEDINO20180403_11	14.22813668	54.52731208	03.04.2018/09:49
SEDINO20180403_12	14.23258575	54.51847644	03.04.2018/10:04
SEDINO20180403_13	14.26240691	54.5346328	03.04.2018/10:18
SEDINO20180403_14	14.26219781	54.52372208	03.04.2018/10:32
SEDINO20180403_15	14.26722273	54.52257252	03.04.2018/10:45
SEDINO20180403_16	14.27679375	54.52436095	03.04.2018/11:01
SEDINO20180403_17	14.34799465	54.52090407	03.04.2018/11:24
SEDINO20180403_18	14.37660232	54.52935376	03.04.2018/11:37
SEDINO20180403_19	14.4099692	54.53470492	03.04.2018/11:54
SEDINO20180403_20	14.44253775	54.5320535	03.04.2018/12:16
SEDINO20180403_21	14.4775933	54.527692	03.04.2018/12:35
SEDINO20180403_22	14.52420863	54.53259254	03.04.2018/12:50
SEDINO20180403_23	14.55841018	54.53081993	03.04.2018/13:09
SEDINO20180403_24	14.5916853	54.52161558	03.04.2018/13:26
SEDINO20180403_25	14.60766313	54.53493696	03.04.2018/13:41
SEDINO20180403_26	14.12477621	54.50291202	03.04.2018/13:55
SEDINO20180403_27	14.13581349	54.51041059	03.04.2018/14:10
SEDINO20180403_28	14.14747093	54.50402534	03.04.2018/14:25
SEDINO20180403_29	14.15643993	54.50104448	03.04.2018/14:43

SEDINO20180406_30	14.16077119	54.50102706	06.04.2018/07:04
SEDINO20180406_31	14.16519053	54.50871462	06.04.2018/07:15
SEDINO20180406_32	14.16733698	54.50364063	06.04.2018/07:34
SEDINO20180406_33	14.16936909	54.50417775	06.04.2018/07:50
SEDINO20180406_34	14.17345062	54.50035346	06.04.2018/08:08
SEDINO20180406_35	14.17679755	54.50051897	06.04.2018/08:26
SEDINO20180406_36	14.18055588	54.5005445	06.04.2018/08:40
SEDINO20180406_37	14.17806567	54.5024775	06.04.2018/08:56
SEDINO20180406_38	14.17741305	54.51055805	06.04.2018/09:08
SEDINO20180406_39	14.17811706	54.51213227	06.04.2018/09:49
SEDINO20180406_40	14.18442486	54.50732399	06.04.2018/10:01
SEDINO20180406_41	14.18668459	54.50876597	06.04.2018/10:13
SEDINO20180406_42	14.25507784	54.50059855	06.04.2018/10:29
SEDINO20180406_43	14.25695532	54.50070522	06.04.2018/10:54
SEDINO20180406_44	14.29663716	54.50251199	06.04.2018/11:06
SEDINO20180406_45	14.34005613	54.50589559	06.04.2018/11:24
SEDINO20180406_46	14.38979661	54.51333808	06.04.2018/11:35
SEDINO20180406_47	14.41945647	54.50259333	06.04.2018/11:47
SEDINO20180406_48	14.46844093	54.50610008	06.04.2018/11:56
SEDINO20180406_49	14.51632066	54.5092116	06.04.2018/12:04
SEDINO20180406_50	14.55443054	54.50456897	06.04.2018/12:16
SEDINO20180406_51	14.57674433	54.51206811	06.04.2018/12:30
SEDINO20180406_52	14.6223079	54.50803393	06.04.2018/12:47
SEDINO20180406_53	14.65561678	54.51227087	06.04.2018/12:56
SEDINO20180406_54	14.69206756	54.50181144	06.04.2018/13:10

Giant Box Corer

Name	Longitude	Latitude	Date/Time
SEDINO_AL506_KG1	14° 14,064‘	54° 30,169‘	04.04.2018/07:19
SEDINO_AL506_KG2	14° 10,689‘	54° 30,166‘	04.04.2018/07:43
SEDINO_AL506_KG3	14° 15,448‘	54° 30,048‘	04.04.2018/08:07
SEDINO_AL506_KG4	14° 11,192‘	54° 30,628‘	04.04.2018/07:05
SEDINO_AL506_KG5	14° 38,455‘	54° 30,991‘	07.04.2018/07:02
SEDINO_AL506_KG6	14° 35,905‘	54° 31,354‘	07.04.2018/07:28
SEDINO_AL506_KG7	14° 35,232‘	54° 31,160‘	07.04.2018/07:47
SEDINO_AL506_KG8	14° 31,251‘	54° 30,859‘	07.04.2018/08:21

Gravity Corer Stations

Name	Longitude	Latitude	Date/Time
SEDINO-Al506-20180328-1	11° 23,991‘	54° 29,786‘	28.03.2018/11:29
SEDINO-Al506-20180328-2A	11° 24,006‘	54° 29,784‘	28.03.2018/11:40
SEDINO-Al506-20180328-2B	11° 24,000‘	54° 29,784‘	28.03.2018/11:56
SEDINO-Al506-20180328-3A	11° 24,017‘	54° 29,780‘	28.03.2018/12:12
SEDINO-Al506-20180328-3B	11° 24,010‘	54° 29,781‘	28.03.2018/12:25
SEDINO-Al506-20180328-4	11° 24,013‘	54° 29,777‘	28.03.2018/12:36
SEDINO-Al506-20180328-5	11° 24,031‘	54° 29,772‘	28.03.2018/12:52

Under Water Videoe

Name	Longitude	Latitude	Date/Time	
Videoprofile 1	-	-	-	Start
Videoprofile 1	-	-	-	End
Videoprofile 2	14° 10,629‘	54° 30,486‘	03.04.2018/09:27	Start
Videoprofile 2	14° 10,998‘	54° 30,643‘	03.04.2018/09:56	End
Videoprofile 3	14° 10,634‘	54° 29,933‘	03.04.2018/10:15	Start
Videoprofile 3	14° 10,916‘	54° 30,104‘	03.04.2018/10:43	End
Videoprofile 4	14° 09,262‘	54° 30,027‘	03.04.2018/11:15	Start
Videoprofile 4	14° 09,191‘	54° 31,793‘	03.04.2018/13:10	End
Videoprofile 5	14° 15,459‘	54° 30,007‘	06.04.2018/09:47	Start
Videoprofile 5	14° 15,070‘	54° 30,205‘	06.04.2018/10:06	End
Videoprofile 6	14° 12,896‘	54° 30,180	06.04.2018/10:32	Start
Videoprofile 6	14° 13,085‘	54° 30,342‘	06.04.2018/10:54	End
Videoprofile 7	14° 12,231‘	54° 30,020‘	06.04.2018/11:18	Start
Videoprofile 7	14° 12,755‘	54° 30,126‘	06.04.2018/11:58	End
Videoprofile 8	14° 09,956‘	54° 30,210‘	06.04.2018/12:29	Start
Videoprofile 8	14° 10,286‘	54° 30,293‘	06.04.2018/12:47	End
Videoprofile 9	14° 14,850‘	54° 27,748‘	08.04.2018/11:35	Start
Videoprofile 9	14° 14,044‘	54° 27,647‘	08.04.2018/12:02	End
Videoprofile 10	14° 13,182‘	54° 27,723‘	08.04.2018/12:22	Start
Videoprofile 10	14° 12,787‘	54° 27,566‘	08.04.2018/12:52	End